

What is claimed is:

1. A method of drilling a well bore comprising the steps of:
providing a drilling composition comprising a drilling fluid and a consolidating material; and,
using the drilling composition while drilling the well bore and allowing the consolidating material in the drilling composition to penetrate into the walls of the well bore.
2. The method of claim 1 wherein the consolidation material has a viscosity of less than about 100 cP.
3. The method of claim 1 wherein the consolidation material comprises a hardenable resin component, the hardenable resin component comprising a hardenable resin and a hardening agent component, a liquid hardening agent, a silane coupling agent, and a surfactant.
4. The method of claim 3 wherein the hardenable resin in the liquid hardenable resin component is an organic resin comprising bisphenol A-epichlorohydrin resin, polyepoxide resin, novolak resin, polyester resin, phenol-aldehyde resin, urea-aldehyde resin, furan resin, urethane resin, glycidyl ethers, or mixtures thereof.
5. The method of claim 3 wherein the liquid hardening agent in the liquid hardening agent component comprises amines, aromatic amines, aliphatic amines, cyclo-aliphatic amines, piperidine, triethylamine, benzyldimethylamine, N,N-dimethylaminopyridine, 2-(N₂N-dimethylaminomethyl)phenol, tris(dimethylaminomethyl)phenol, or mixtures thereof.
6. The method of claim 3 wherein the silane coupling agent in the liquid hardening agent component comprises N-2-(aminoethyl)-3-aminopropyltrimethoxysilane, 3-glycidoxypropyltrimethoxysilane, n-beta- (aminoethyl)-gamma-aminopropyl trimethoxysilane or mixtures thereof.
7. The method of claim 3 wherein the surfactant in the liquid hardening agent component comprises ethoxylated nonyl phenol phosphate ester, mixtures of one or more cationic surfactants, a C₁₂ – C₂₂ alkyl phosphonate surfactant, one or more non-ionic surfactants and an alkyl phosphonate surfactant, or mixtures thereof.
8. The method of claim 3 wherein the resin-type coating material is a furan-based resin comprising furfuryl alcohol, a mixture furfuryl alcohol with an aldehyde, a mixture of furan resin and phenolic resin or mixtures thereof.

9. The method of claim 3 further comprising a solvent comprising 2-butoxy ethanol, butyl acetate, furfuryl acetate, or mixtures thereof.

10. The method of claim 1 wherein the consolidation material is a phenolic-based resin comprising terpolymer of phenol, phenolic formaldehyde resin, a mixture of phenolic and furan resin, or mixtures thereof.

11. The method of claim 10 further comprising a solvent comprising butyl acetate, butyl lactate, furfuryl acetate, 2-butoxy ethanol, or mixtures thereof.

12. The method of claim 1 wherein the consolidation material is a HT epoxy-based resin comprising bisphenol A-epichlorohydrin resin, polyepoxide resin, novolac resin, polyester resin, glycidyl ethers, or mixtures thereof.

13. The method of claim 12 further comprising a solvent comprising dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d'limonene, fatty acid methyl esters, or mixtures thereof.

14. The method of claim 1 wherein the resin consolidation material is a phenol/phenol formaldehyde/furfuryl alcohol resin comprising from about 5% to about 30% phenol, from about 40% to about 70% phenol formaldehyde, from about 10 to about 40% furfuryl alcohol, from about 0.1% to about 3% of a silane coupling agent, and from about 1% to about 15% of a surfactant.

15. The method of claim 14 further comprising a solvent comprising 2-butoxy ethanol, butyl acetate, furfuryl acetate, or combinations thereof.

16. The method of claim 1 wherein the fluid component of the drilling fluid comprises an aqueous gel or an emulsion.

17. The method of claim 1 wherein the consolidating material penetrate into the walls of the well bore from about 0.1 to about 3 inches.

18. The method of claim 1 wherein the drilling composition further comprises a fluid loss control material.

19. The method of claim 18 wherein the fluid loss control material comprises a aliphatic polyester, a polylactic acid, a poly(lactide), or a combination thereof.

20. A method of consolidating formation particulates surrounding a well bore comprising the steps of:

providing a drilling composition comprising a drilling fluid and a consolidating material; and,

using the drilling composition while drilling the well bore and allowing the consolidating material in the drilling composition to penetrate into the walls of the well bore.

21. The method of claim 20 wherein the consolidation material has a viscosity of less than about 100 cP.

22. The method of claim 20 wherein the consolidation material comprises a hardenable resin component comprising a hardenable resin and a hardening agent component comprising a liquid hardening agent, a silane coupling agent, and a surfactant.

23. The method of claim 22 wherein the hardenable resin in the liquid hardenable resin component is an organic resin comprising bisphenol A-epichlorohydrin resin, polyepoxide resin, novolak resin, polyester resin, phenol-aldehyde resin, urea-aldehyde resin, furan resin, urethane resin, glycidyl ethers, or mixtures thereof.

24. The method of claim 22 wherein the liquid hardening agent in the liquid hardening agent component comprises amines, aromatic amines, aliphatic amines, cyclo-aliphatic amines, piperidine, triethylamine, benzyldimethylamine, N,N-dimethylaminopyridine, 2-(N,N-dimethylaminomethyl)phenol, tris(dimethylaminomethyl)phenol, or mixtures thereof.

25. The method of claim 22 wherein the silane coupling agent in the liquid hardening agent component comprises N-2-(aminoethyl)-3-aminopropyltrimethoxysilane, 3-glycidoxypropyltrimethoxysilane, n-beta- (aminoethyl)-gamma-aminopropyl trimethoxysilane or mixtures thereof.

26. The method of claim 22 wherein the surfactant in the liquid hardening agent component comprises ethoxylated nonyl phenol phosphate ester, mixtures of one or more cationic surfactants, a C₁₂ – C₂₂ alkyl phosphonate surfactant, one or more non-ionic surfactants and an alkyl phosphonate surfactant, or mixtures thereof.

27. The method of claim 22 wherein the resin-type coating material is a furan-based resin comprising furfuryl alcohol, a mixture furfuryl alcohol with an aldehyde, a mixture of furan resin and phenolic resin or mixtures thereof.

28. The method of claim 22 further comprising a solvent comprising 2-butoxy ethanol, butyl acetate, furfuryl acetate, or mixtures thereof.
29. The method of claim 20 wherein the consolidation material is a phenolic-based resin comprising terpolymer of phenol, phenolic formaldehyde resin, a mixture of phenolic and furan resin, or mixtures thereof.
30. The method of claim 29 further comprising a solvent comprising butyl acetate, butyl lactate, furfuryl acetate, 2-butoxy ethanol, or mixtures thereof.
31. The method of claim 20 wherein the consolidation material is a HT epoxy-based resin comprising bisphenol A-epichlorohydrin resin, polyepoxide resin, novolac resin, polyester resin, glycidyl ethers, or mixtures thereof.
32. The method of claim 31 further comprising a solvent comprising dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d'limonene, fatty acid methyl esters, or mixtures thereof.
33. The method of claim 20 wherein the resin consolidation material is a phenol/phenol formaldehyde/furfuryl alcohol resin comprising from about 5% to about 30% phenol, from about 40% to about 70% phenol formaldehyde, from about 10 to about 40% furfuryl alcohol, from about 0.1% to about 3% of a silane coupling agent, and from about 1% to about 15% of a surfactant.
34. The method of claim 33 further comprising a solvent comprising 2-butoxy ethanol, butyl acetate, furfuryl acetate, or combinations thereof.
35. The method of claim 20 wherein the fluid component of the drilling fluid comprises an aqueous gel or an emulsion.
36. The method of claim 20 wherein the consolidating material penetrate into the walls of the well bore from about 0.1 to about 3 inches.
37. The method of claim 20 wherein the drilling composition further comprises a fluid loss control material.
38. The method of claim 37 wherein the fluid loss control material comprises a aliphatic polyester, a polylactic acid, a poly(lactide), or a combination thereof.